

Research Paper

Determining Capital Adequacy for Banks



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Executive Summary

The 2016 Comprehensive Capital Analysis and Review (CCAR) stress test exercises now cover 33 Bank Holding Companies, up from 19 five years back. With the Federal Reserve's focus on increasing the coverage, there is a growing need amongst Banks for adequate capital management and well-defined capital policies amidst more than ever vulnerable financial markets.

The objectives of CCAR include:

- Ensure that institutions develop and demonstrate robust, **forward-looking capital planning processes** that account for their unique risks.
- Ensure that institutions **establish sufficient capital** to continue operations throughout times of economic and financial stress.
- Evaluate and approve/object to **capital distribution plans** proposed by institutions.

In this paper, in line with the objectives described above, we discuss ways for Banks to determine the adequate capital levels consistent with their risk appetite and key planned and contingency capital actions as part of the overall capital management policies.

First, we discuss in detail, different methods or frameworks used to measure the risk of a Bank. These include Regulatory Capital (RCAP) which captures risk through current risk weighted methodologies as per Basel III, Enterprise Stress Testing which captures impacts of risks in stress scenarios including idiosyncratic risk and Economic Capital (ECAP) which is an internal measure of credit, market and operational risk.

Next through the target setting process, the Bank defines the required level of capital to protect against identified risks. These targets are set up for current and forecasted capital ratios under baseline and stress scenarios, taking into consideration various regulatory and internal factors.

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Approach recommended in this paper is to compare stipulated RCAP with Bank's internal RCAP (using capital ratios) and utilize ECAP models to glean insights on appropriate risk areas and size for capital buffers over and above Bank's internal RCAP.

We conclude this paper with a discussion on planned Capital Actions as well as some remediation steps in form of contingency actions, in case the capital targets are breached.

The target audience of this document is a risk professional who wants to get an understanding of Capital Management as it links to CCAR, Regulatory Capital, Stress Testing and Economic Capital.

This document doesn't prescribe or get into the details of Credit, Market or Operational Risk nor tries to prescribe the levers for reducing the risk weighted assets (RWA) or increasing the Capital base. Rather it assumes that the Bank would already be taking measures to increase the ratio given all potential limitations.

Introduction

Capital management goals of a Bank are to maintain at all times, adequate levels of capital to ensure ongoing viability of the Bank while optimizing the use of capital to maximize shareholder value. An effective capital adequacy assessment has been laid out by Federal Reserve Board (FRB) in the CCAR instructions and guidelines 2015 which includes seven key principles of an effective Capital adequacy assessment framework:

1. Sound foundational risk management
2. Effective loss-estimation methodologies
3. Solid resource-estimation methodologies
4. Sufficient capital adequacy impact assessment
5. Comprehensive capital policy and capital planning
6. Robust internal controls
7. Effective governance

Our focus in this document will be on principles 4 & 5 to help Banks determine the adequate capital levels appropriate for their risk profile and consistent with their risk appetite. This also translates into a goal for Capital Management. At the same time, ensuring that a Bank is not too conservative and holding excess capital. Our endeavor in this paper will be to lay down the steps for a Bank to hold the **optimum** capital. Through this document, the term 'Bank' can be synonymous with a Bank Holding Company or a Financial Institution that is subject to regulatory guidelines.

The document is further divided into four sections- 1) Risk measurement frameworks, 2) Target setting which links the frameworks in trying to determine optimum capital, 3) Capital actions and 4) Contingency plan.

1. Risk Measurement

Regulatory Capital, Enterprise Stress Testing and Economic Capital are frameworks that are used to quantify a Bank's capital needs based on its risk exposure and assess the adequacy of available capital.

1. Regulatory Capital: Baseline capture of risks through current risk-based capital methodologies (U.S. Basel III).
2. Enterprise Stress Testing: Captures stressed impacts of risks, as well as idiosyncratic risks.
3. Economic Capital: Internal measure that captures Credit, Market and Operational Risks using Bank's Economic Capital methodology.

These risk measurement frameworks are discussed below.

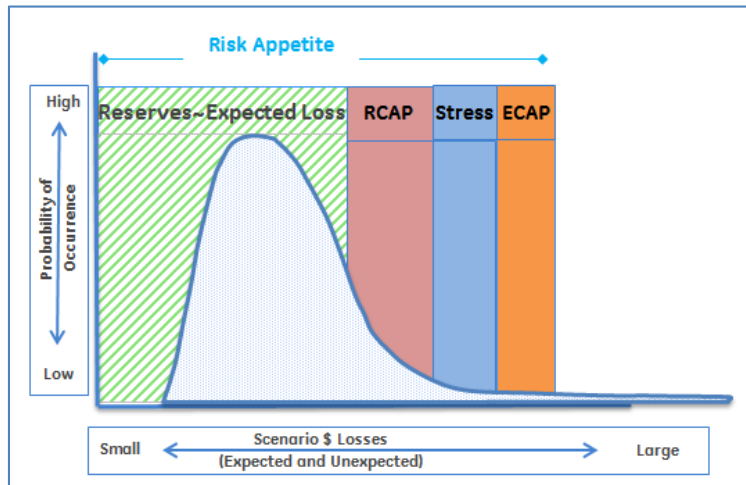


Figure 1- Risk measurement frameworks

Capital Planning measures the risks of a portfolio to estimate its unexpected losses and make provision for those unexpected losses accordingly. The figure above represents different risk measurement frameworks like RCAP, Stress and ECAP.

Regulatory Capital (RCAP)

RCAP is the minimum amount of capital that a Bank has to hold as required by FRB. In order to assess the Bank's capital adequacy, regulatory capital ratios should be calculated and used as benchmark for regular monitoring of a Bank's capital levels.

These regulatory capital ratios are calculated in accordance with Basel 3 final rules and key ratios monitored are Common Equity Tier 1 ratio (CET1), Tier 1 Capital ratio, Total Risk Based Capital ratio, Leverage ratio and Supplementary Leverage Ratio. For most Banks, CET1 ratio is the most important ratio for Capital Management given its high loss absorbing capacity. In the examples below, we have used CET1 ratio to draw comparisons.

Minimum capital requirements and additional buffers as required under Basel 3 and conservatively estimated for potential future regulations, include: fully phased-in minimum requirement for CET1 ratio (4.5%), conservation buffer (2.5%) and a potential short-term wholesale funding risk buffer (0.5% - 1.0%), totaling a CET1 ratio in excess of 8%.

Stress Testing

Firm-Wide Stress Testing is performed on all material risks that a Bank is exposed to and highlight material weaknesses and vulnerabilities of the Stress Testing process to enable informed Capital Planning actions.

Two types of Stress scenarios are utilized by the Banks. Stress scenarios as required by the regulators as well as scenarios prepared internally taking into account specific macroeconomic and idiosyncratic risks faced by the Bank. The internal stress scenarios must be severe but conceivable evaluating bank's risk exposures over 9 quarter projections.

Economic Capital (ECAP)

Economic Capital is used as a core tool for assessment of Capital Adequacy for a Bank. It is calculated based on the material Enterprise Risks the Bank undertakes, including but not limited to Credit and Investment Risk, Interest Rate Risk, Foreign Exchange Risk and Operational Risk. ECAP represents the amount of capital necessary to ensure the continued solvency of the Bank in the event of extreme unexpected loss, consistent with a target credit agency debt rating over a defined time horizon. It provides a common basis for the quantitative comparison and aggregation of various exposures across multiple business lines and risk categories. Most Banks use a confidence measurement of between 99.96% and 99.98%, which is the insolvency rate expected for an institution with an AA credit rating.

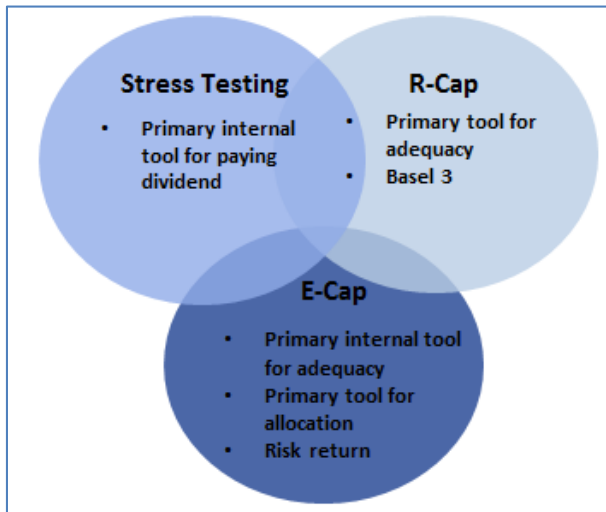


Figure 2- Capital Planning tools

2. Target Setting

Capital Adequacy targets are set up to define the acceptable level of risk within a Bank's risk appetite. These targets are set up for current and forecasted capital ratios under baseline and stress scenarios, taking into consideration regulatory standards, internal assessment of required capital,

stakeholder perceptions of the Bank as a viable going concern, requirements for continued access to funding markets, target external credit ratings and requirements to maintain ability to lend to borrowers.

Below we suggest a two pronged approach to determine *optimum* capital levels.

- a) Compare Regulatory stipulated RCAP to internal RCAP for the Bank.

Regulatory stipulated Capital Level

Regulatory stipulated base capital is sized in accordance of CCAR minimum requirement of 4.5% for Basel 3 Common Equity Tier 1 ratio as shown in the figure below. In addition, a common equity tier 1 capital conservation buffer of 2.5 % of risk-weighted assets will apply in a phased manner to all supervised financial institutions. As per Basel 3, reduction in procyclical nature of lending by promoting countercyclical buffers will be phased in parallel to conservation buffer between January 2016 and December 2018.

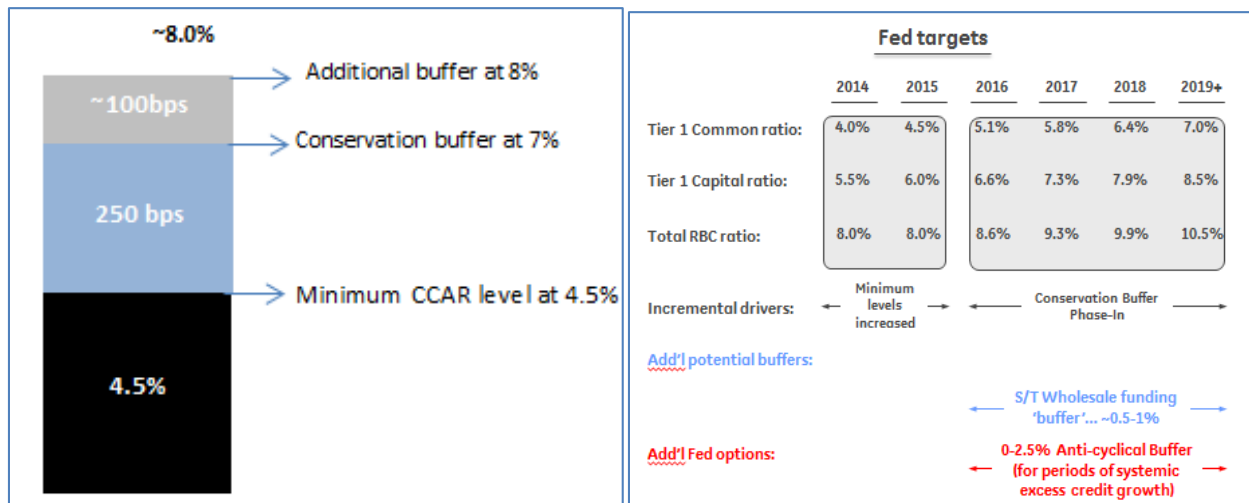


Figure 3- Regulatory stipulated capital & Fed targets

Base Capital and Internal Capital Level

Now, from a Bank's perspective, capital targets can be set in terms of Base and Internal capital levels. Respectively, these targets represent the post-stress minimum capital level, and the target capital level at which the Bank seeks to operate in the expected course of business.

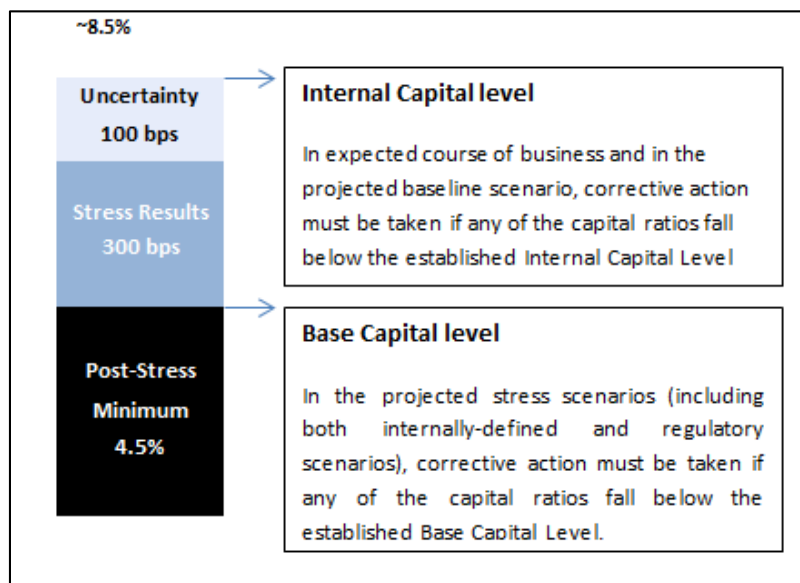


Figure 4- Base and Internal Capital

Base Capital Level is intended to reflect the minimum capital required to be regarded as a viable going concern. Factors such as stakeholder perspectives, industry perspectives, historical and peer performance are taken into consideration while setting the base capital. Most importantly, base capital is sized in accordance of CCAR minimum requirement of 4.5% for Basel 3 Common Equity Tier 1 ratio, under forecasted baseline and stress scenarios.

Internal capital level is intended to reflect the target capital level in the expected course of business that is sufficient to withstand severe stress and maintain sufficient capital to remain above the Base Capital Level. The Internal Capital Level consists of:

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i. Capital depletion from Stress

The Bank quantifies additional capital required above the Base Capital Level based upon the results of both regulator and internally specified stress scenarios. Capital depletion resulting from each risk exposure under multiple scenarios is included as input in quantifying stress capital.

ii. Uncertainty Buffer

Additional uncertainty can exist in the capital assessment framework due to imperfect model, data or governance processes. To address these uncertainties, the Bank must have a comprehensive model risk management framework including internal controls, data governance and infrastructure and implementation procedures.

If a Bank is still in the early phases of establishing a comprehensive model governance framework, it must allocate compensating capital based on qualitative/quantitative assessment of data, model and governance weaknesses and vulnerabilities.

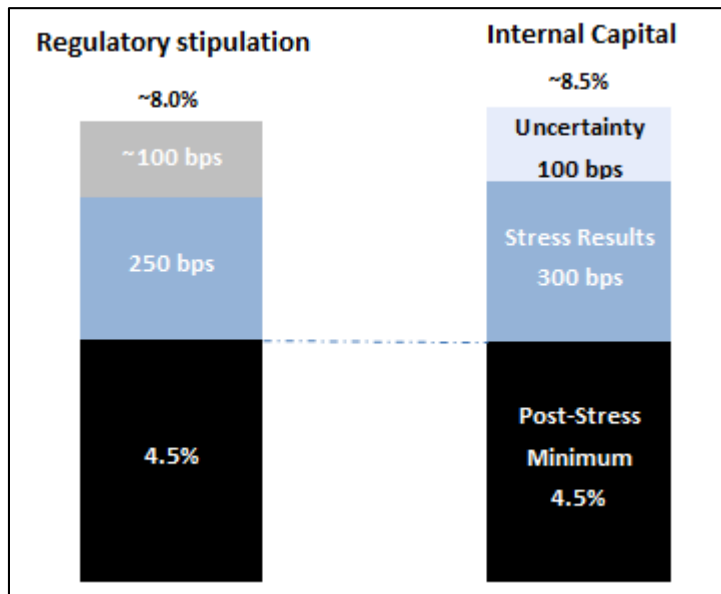


Figure 5- Example to compare Regulatory stipulated RCAP to Internal RCAP

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In the above example, we have assumed that based on internal calculations and estimations, a Bank maintains 3% for stress and 1% towards uncertainty respectively, thus totaling 8.5% for CET-1 ratio.

As a first step, the regulatory stipulation (including CET1 minimum and additional buffers) would be compared to internal capital levels which takes into account severe stress reflective of Bank's risk appetite and model risk vulnerabilities over and above minimum requirement.

In a hypothetical scenario where Internal Capital is greater than regulatory stipulation of 8% as seen above, a Bank must hold capital equivalent to Internal Capital in expected course of business and in the projected baseline scenario. Corrective action must be taken if any of the capital ratios fall below the established Internal Capital Level. However in projected stress scenarios (including both internally-defined and regulatory scenarios), corrective action must be taken if any of the capital ratios fall below the established post stress minimum level. This is further explained below in Capital Contingency Actions

Economic Capital Level

Our research shows that large Banks are increasingly weaning towards Economic Capital as a measure of Capital Adequacy.

While Economic Capital is used as an input to determine capital adequacy, it can also be used for

- Allocation of capital to product portfolios and P&L's that enables i) interest expense allocation and ii) match-funding;
- Evaluation of the returns on proposed transactions;
- Performance measurement of products, business platforms; and
- Limit-setting.

On the other hand Regulatory Capital only aims to set minimum capital requirements against all risks in a bank under a range of regulatory rules and guidance.

Although ECAP models measure the capital that needs to be held to avoid insolvency at a given confidence level, Banks face other challenges like risk of failing to keep regulatory capital ratios or risk that the Bank will be unable to pay dividends. ECAP models can be used to glean insights on appropriate risk areas and size for capital buffers over and above required RCAP in establishing Bank's Internal Capital level.

- b) Compare internal RCAP to Economic Capital for the Bank.

For Banks that measure Economic Capital for Capital Adequacy purposes, as a 2nd step the Internal RCAP(as computed in Step 1 above) must be compared to the Economic Capital available to determine adequate or optimum capital levels. Banks compare economic capital requirements with available capital to gauge whether the degree of leverage is appropriate for the amount of risk undertaken and the institution's desired credit quality.

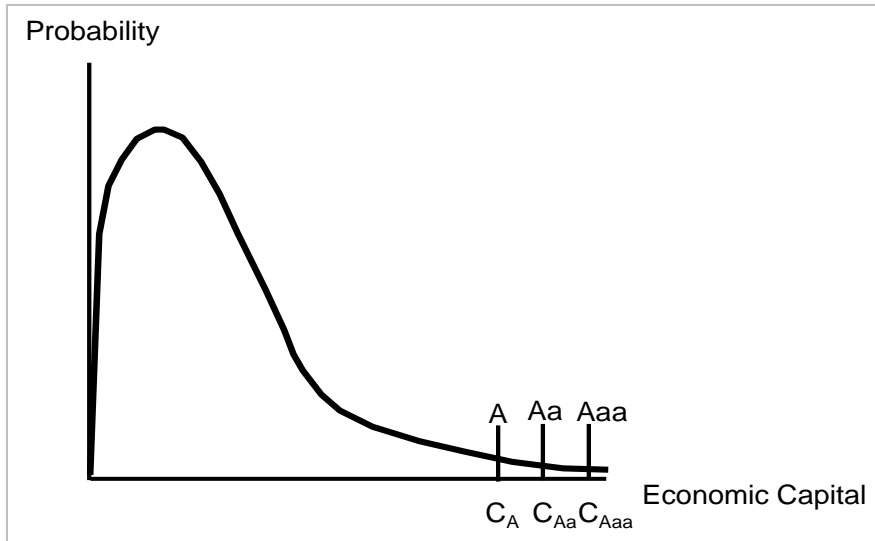
Economic Capital Surplus = Capital Available – Economic Capital Required

- i. Capital Available

Economic Capital Available represents the financial resources the Bank has available to absorb unexpected losses. Capital Available should not be at book value; rather Banks must compare Economic Capital Required with market based measures of Available Capital. This would require, as a first step, calculating the market value of the loan portfolio, including hedges.

- ii. Economic Capital Required

ECAP charges or "Leverages" (the ratio of debt to equity for an asset) are estimated annually as a part of the Annual Economic Capital Review process. The ECAP charges are applied on a quarterly basis to the balance sheet to determine the amount of ECAP Required.



- In the above figure, given the portfolio loss distribution and a target debt rating, the required economic capital may be inferred.

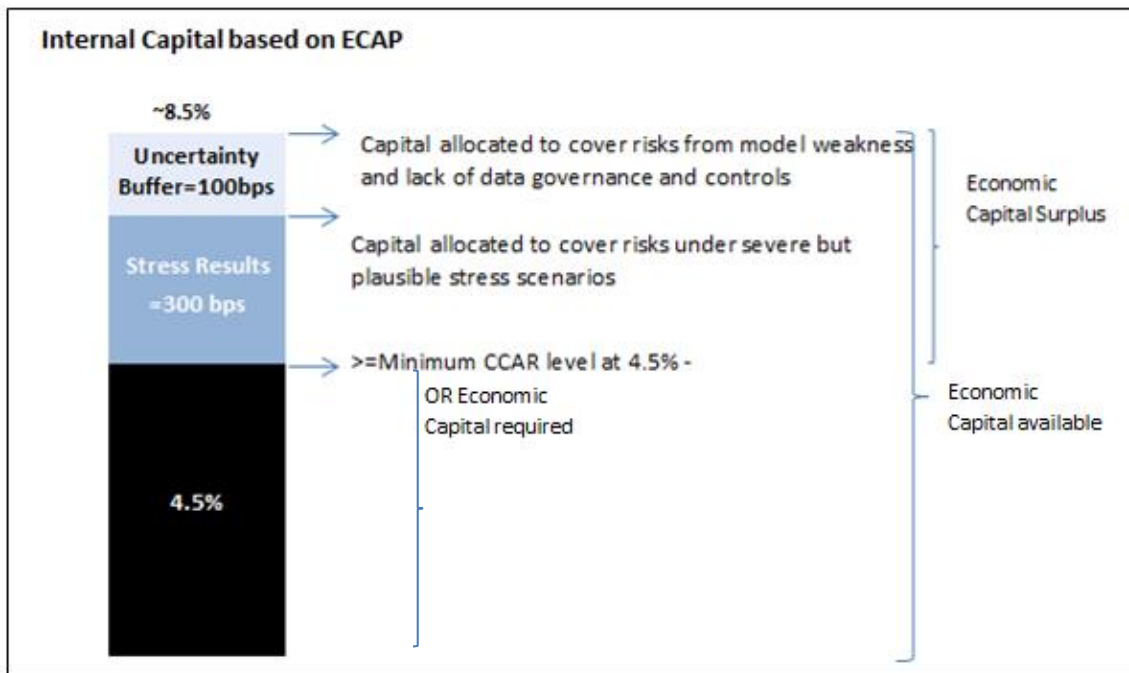


Figure 6- Internal Capital based on ECAP

A key assumption above is that the ECAP required is equal to the post stress minimum or the base capital level, thus enabling comparison of Economic Capital surplus to the stress and uncertainty buffer.

Economic Capital Surplus for a Bank is generally represented in dollar terms; thus for comparison, it is converted in percentage to draw a comparison to the buffer that needs to be maintained for Stress and Uncertainty. In the above example, assuming the ECAP surplus is \$ 3BN- this amount is compared to 400 bps.

This is a simplistic representation and based on the above, the Bank's management must determine the optimum Capital Adequacy to take care of all material risks.

Challenges in aligning Regulatory Capital and Economic Capital Management:

In reality one of the key challenges faced by Banks is that internal RCAP and required ECAP may give contradictory messages given the differences in their purposes and calculations, making it difficult to determine the Bank's actual risk bearing capacity.

Some companies have tried to resolve this challenge by aligning RCAP with ECAP through "going concern" capital management tools. As discussed earlier, even though ECAP models measure the capital requirement to avoid insolvency, today there is a need to manage companies against other more likely events like failure to maintain regulatory ratios, failure to pay dividends etc. A going concern model considers this by adding a capital buffer to the existing RCAP as a safety cushion, if such events were to occur. The amount of capital buffer is determined by the going-concern model based on volatility of RCAP, volatility in risk-weighted assets and the company's loss distribution.

3. Planned Capital Actions

Capital actions (distribution of regular, special and preferred dividends) enable a Bank to optimize its capital position while ensuring adequate capital is held for its existing and future material risks. Decision of dividend distribution is based on other factors besides Capital Adequacy, namely,

actual and projected performance, economic conditions and plans related to size of the Balance Sheet. As mentioned, while determining distribution, the Bank must maintain its Capital targets, both Regulatory and Economic Capital. These Capital actions must be included as a part of the Bank's Capital Plan.

4. Capital Contingency Actions

In situations when Capital targets are breached, actions are actions taken to remedy the breaches and thus ensure that capital levels are maintained. These include, but are not limited to: Reduction in Balance Sheet. The Bank can reduce new originations or dispose certain assets or portfolios.

- Reduction in Expense:

Reduce operating expenses through reduction in compensation or decrease in salary increments

- Dividend and Interest payment reduction:

The Bank can delay, reduce or suspend dividends and/or interest payments on certain types of securities without resulting in a default event when contractually allowed.

- Optimize the Balance Sheet:

Reduce exposure to riskier assets; tighten its credit approval process

Conclusion

As Banks move towards capital focused business models, Capital Management is their top most priority. It is therefore imperative for Banks to have a robust Capital Management Policy ensuring a strong capital resource allocation process.

References:

- 1) Ho, Amelia. (2012). “Weaknesses in Regulatory Capital Models and Their Implications”
<http://www.ermssymposium.org/2012/otherpapers/ho-paper-03-23-12.pdf>
- 2) McKinsey (2012). “Capital Management – Banking’s new imperative”
- 3) Elildea, Abel and Repullob, Rafael (2007). “Economic and Regulatory Capital in Banking: What is the Difference?” <http://www.ijcb.org/journal/ijcb07q3a3.pdf>
- 4) Board of Governors of the Federal Reserve System, (2014).”Comprehensive Capital Analysis and Review 2015 Summary Instructions and Guidelines”
<http://www.federalreserve.gov/newsevents/press/bcreg/bcreg20141017a1.pdf>
- 5) H. Rodgin Cohen, Andrew R. Gladin, Mark J. Welshimer, and Lauren A. Wansor (2014)
“Bank Capital Plans and Stress Tests” <https://corpgov.law.harvard.edu/2014/11/18/bank-capital-plans-and-stress-tests-2/>